REMARKS

Claims 1-49 are pending. Claims 1-37, 48 and 49 are rejected. Claims 38-47 are withdrawn.

Rejections under 35 U.S.C. §103

Claims 1-17, 18-37 and 48-49 are rejected as being obvious over U.S. Patent No. 6,294,281 to Heller ("Heller") in view of U.S. Patent No. 6,689,439 to Sobolewski ("Sobolewski"), and further in view of U.S. Patent No. 6,869,721 to Imazato ("Imazato").

Claimed invention

Claim 1 defines an electrochemical cell for use with active implantable medical devices. The electrochemical cell comprises: (a) an anode having a first immobilized enzyme deposited on a first surface of said anode, said first immobile enzyme capable of catalyzing an electrooxidation of a reducing agent; (b) a cathode having a second immobilized enzyme deposited on a second surface of said cathode, said second enzyme capable of catalyzing an electroreduction of an oxidizing agent; (c) an aqueous solution containing said reducing agent and said oxidizing agent, said solution in contact with said first immobilized enzyme and said second immobilized enzyme; and (d) a housing for providing mechanical support and electrical separation of said anode and said cathode. **The anode or cathode comprises a nanostructured material.**

Similar to claim 1, claims 20 and 48 respectively define **an electrochemical cell that requires the anode or cathode recited therein comprise a nanostructured material**.

Claim 49 is drawn to **an electrochemical cell that includes nanostructured metal nanowires or carbon nanotube electrodes**.

Cited references

1. Heller

Heller describes an electrochemical cell for use in an implantable device. The electrochemical cell includes an anode having an anode enzyme, a cathode having a cathode enzyme, an anode hydrogel, and a cathode hydrogel. **Heller does not teach an anode or cathode that comprises a nanostructured material**.

2. Sobolewski

Sobolewski describes **a gas diffusion substrate** suitable for use within **a fuel cell**. The substrate can include **a plurality of micro-stud elements** as described therein. **Sobolewski does not teach an electrochemical cell.**

3. Imazato

Imazato describes method or process for producing a gas diffusion electrode for **a oxygen/hydrogen fuel cell**. The electrode can include **a sheet-like aggregate** of carbon nanotube, which can include a catalyst layer formed thereon. The catalyst layer can include metals such as platinum, platinum alloy, palladium, magnesium, titanium, etc (cols. 3 and 4).

Analysis

1. The cited references provide no motivation for a person of ordinary skill in the art to combine them

The cited references, individually or combined, provide no motivation for a person of ordinary skill in the art to combine them. **Heller is drawn to an electrochemical cell used in implantable devices**. An electrochemical cell is based on an electrochemical process utilizing difference in chemical potentials in different oxidation state of a molecule. In Heller, such an electrochemical process is a biological process where an enzyme or multiple enzymes catalyze the transition of the different oxidative states of a biological molecule so as to generate electricity. Therefore, in Heller, in the words of the art, the enzyme or multiple enzymes act as a catalyst(s) and the biological molecule acts as a substrate of the enzymes (catalysts).

To a person of ordinary skill in the art, Sobolewski and Imazato are drawn to entirely

different cells. both Sobolewski and Imazato are drawn to gas fuel cells, which are used for mechanical articles such as automobiles, etc. A gas fuel cell is based on burning of a gas in the air to generate electricity. In the words of the art, a catalyst in a gas fuel cell is generally a heavy metal such as platinum, and the substrate is generally an mechanical article that holds the catalyst, e.g., an anode or cathode. **A person of ordinary skill in the art would recognize that the catalyst and substrate in an electrochemical cell and the same words in a gas fuel cell have entirely different meanings, and thus the advantages taught by Sobolewski and Imazato are entirely irrelevant to Heller**. For example, the advantages noted by the Examiner, improved gas diffusion and mechanical strength of a fuel cell using nanowire or nanorods, are entirely irrelevant to the electrochemical cell disclosed in Heller for the electrochemical cell in Heller does not use gas and improved mechanical strength of a particular component is of no concern since the electrochemical cell in Heller is for use in an implantable device where mechanical impact on the cell is not a concern whatsoever. In addition, how a nano wire or nano rod would impart improved mechanical strength to the rod or wire as compared to normal scale wire or rod is also unclear to a person of ordinary skill in the art. In fact, the cited description of Sobolewski by the Examiner at col. 2, lines 45-65, col. 3, lines 45-55 discusses improved gas diffusion and improved mechanical characteristics in terms of improved flow resistance by using nano wire or nano rod.

Another advantage identified by the Examiner, "improved electric conductivity" using nanowire or nanorods, is an incorrect statement against physical principles to a person of ordinary skill in the art. Electric conductivity of a conducting material (e.g., wire or rod) is inversely proportional to the sectional area of the material. Compared to normal scale rods or wires, nano rods or nano wires would have lower, rather than higher, electric conductivity.

In sum, to a person of ordinary skill in the art, Heller, Sobolewski and Imazato provide no motivation to combine these references.

2. The cited references would not lead a person of ordinary skill in the art to have a reasonable expectation of success of the claimed invention

As discussed above, the advantages of a gas fuel cell disclosed in Sobolewski and Imazato using nano rods or nano wires are entirely irrelevant to an electrochemical cell as defined by the claimed invention. Therefore, a person of ordinary skill in the art would not have a reasonable of success to combine the teachings of Sobolewski and Imazato with those of Heller so as to arrive at the claimed invention.

In the Office Action mailed on November 26, 2007 (page 7, second paragraph), the Examiner alleges that Applicant argues the references individually. Applicant respectfully submits this assertion is unfounded and believes the above discussions clearly demonstrate such.

In sum, claims 1, 20, 33, 48 and 49, which are independent claims, all recite an electrochemical cell comprising a nanostructured material such as nanostructured nanowire, nanorod, or nanotube, are non-obvious over Heller in view of Sobolewski and further in view of Imazato under 35 U.S.C. §103(a). Claims 2-19, which depend from claim 1, claims 21-32, which depend from claim 20, and claim 34-37, which depend from claim 33, are all patentably allowable over Heller in view of Sobolewski and further in view of Imazato under 35 U.S.C. §103(a) for at least the same reason.

The undersigned authorizes the examiner to charge any fees that may be required or credit of any overpayment to be made to Deposit Account No. **07-1850.**

CONCLUSION

Allowance of the claims is respectfully requested. **If the Examiner has any suggestions or amendments to the claims to place the claims in condition for allowance, applicant would prefer a telephone call to the undersigned attorney for approval of an Examiner's amendment.** If the Examiner has any questions or concerns, the Examiner is invited to telephone the undersigned attorney at (415) 393-9885.

The undersigned authorizes the examiner to charge any fees that may be required or credit of any overpayment to be made to Deposit Account No. **07-1850**.

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Respectfully submitted,

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